

AMENDMENT AND RESPONSE
U.S. Serial No. 09/932,201
Filed: August 17, 2001

REMARKS

This Amendment and Response amends claims 1, 35, and 39 and cancels claims 18, 22, 24, 25, 27, 33, and 34 without prejudice. With this Amendment and Response, claims 1, 2, 4, 5, 8, 10, 12, 13, 17, 19-21, 30, 31, and 35-39 are pending in this application. No fees are believed due; however, the Patent Office is authorized to debit deposit account 11-0855 if it determines otherwise.

I. Allowable Claims

The Action objects to claim 39 as being dependent on a rejected base claim but indicates that claim 39 would be allowable if rewritten in independent form. Claim 39 has been so rewritten and is therefore allowable. Applicants' Assignee respectfully requests removal of this objection and allowance of claim 39.

II. Election/Restriction

The Action maintains that Applicants must cancel all non-elected claims, particularly claims 22, 24, 25, 27, 28, 33, and 34. Claim 28 was cancelled in Applicants' October 22, 2003 Amendment and Response to Office Action. Moreover, while Applicants continue to maintain that these claims are properly examined in this application for the reasons set forth in their January 16, 2003 Amendment and Response to Office Action, they nonetheless have cancelled claims 22, 24, 25, 27, 33, and 34, drawn to the method of manufacturing a commutator, without prejudice to their presentation in a later application.

AMENDMENT AND RESPONSE
U.S. Serial No. 09/932,201
Filed: August 17, 2001

III. Drawings

The Action objects to the drawings as failing to show every feature specified in claim 18. Claim 18 has been cancelled without prejudice, thereby rendering moot the Action's objection to the drawings.

IV. 35 U.S.C. § 112 Rejections

Claim 18 has been rejected under 35 U.S.C. § 112 as failing to comply with the written description requirement. Claim 18 has been cancelled, thereby rendering moot the Action's rejection of this claim.

V. 35 U.S.C. 103 Rejections

A. Nishimura et al. and Vig et al.

Claims 1, 2, 4, 19, and 30 are rejected under 35 U.S.C. § 103 as being unpatentable over Nishimura et al. and Vig et al. Claim 1 has been amended to recite a commutator comprising at least one magnet and a commutator core, each of which comprises a thermo-set resin. Claim 1 has been further amended to recite that the at least one magnet and the commutator core chemically bond to each other via inter-bonding of their thermo-set resins. This subject matter is fully supported by the Specification at pages 5 and 6.

The Action maintains that Nishimura et al. discloses injection molding a commutator around a magnet. However, the Action acknowledges that "Nishimura does not teach a chemical bond between the commutator and the electrically insulating support. Vig teaches the connection between the permanent magnet and the electrically insulating, plastic support can be a chemical bond It would have been obvious to a person of ordinary skill in the art at the time of the invention to construct the commutator of Nishimura with the chemical bond between the magnet and the molded support [of Vig]." Action, page 3, ¶ 9. The Action further maintains that Vig

AMENDMENT AND RESPONSE
U.S. Serial No. 09/932,201
Filed: August 17, 2001

teaches that the plastic in the magnet and support can be a thermoset plastic that can be chemically-bonded to each other. Action, p. 5, ¶ 12.

Applicants' Assignee respectfully disagrees and requests withdrawal of this rejection. Vig fails to teach chemically-bonding thermoset plastics or resins together, but rather teaches one skilled in the art manufacturing techniques for a magnet structure that makes such chemical bonding an impossibility. Vig teaches integrally-forming a magnet structure comprising a magnet and a concentrator. The magnet includes magnetic materials and can also include a plastic material, including a thermoset plastic material. Col. 4, lines 23-31. Similarly, the concentrator includes magnetically permeable material and a plastic material, which can be a thermoset plastic material. Col. 4, lines 5-15.

Vig teaches two techniques for integrally-forming the magnet structure. In one technique, a prefabricated magnet is placed in a mold cavity. See Fig. 2 and col. 5, lines 23-65. A plastic material (which can include a thermoset material) is loaded with magnetically permeable particles and injected into the mold cavity to form the concentrator in contact with the magnet. The prefabricated magnet and concentrator are held together via mechanical bonding between the two components. No chemical bonding occurs, nor does Vig teach any chemical bonding between the prefabricated magnet and the concentrator material used to form the magnet structure with this technique.

Rather, Vig only teaches that chemical bonding can occur by forming the magnet structure using a second technique referred to as the "double shot" technique. See Fig. 3 and col. 5, line 66 to col. 6, line 39. In the double shot technique, both the concentrator and the magnet comprise a plastic compound which can be a thermoset. A first component (either the concentrator or the magnet) is injection molded into the mold first, after which the first

AMENDMENT AND RESPONSE
U.S. Serial No. 09/932,201
Filed: August 17, 2001

component is moved to form a further mold cavity in which the other of the two components (the second component) is injection molded. Vig teaches that if the plastic material used in the components is a thermoset, the thermoset plastic in the first component must be allowed to cure before injection molding the second component into the mold. Col. 6, lines 21-23.

Alternatively, if the plastic material used in the components is not a thermoset (e.g., a thermoplastic), the plastic need only be allowed to harden prior to injection molding of the second component. Col. 6, lines 13-15. In this way, the desired shape of the first component is retained during its movement to create a further mold cavity for the second component.

However, such curing of the thermoset material prior to injection-molding of the second component prevents chemical bonding between the concentrator and the magnet. One skilled in the art readily understands that a thermoset resin undergoes a chemical change that renders it permanently rigid after curing. Adjacent molecules in a thermoset material cross-link with each other to form chains. After the thermoset material is cured, these chains are incapable of cross-linking with the molecules of another thermoset material. Heating a cured thermoset material does not facilitate cross-linking with another thermoset material. Rather, the thermoset material merely degrades if subjected to excessive heat. Thus, contrary to the Action's assertion that "the plastic magnet can be melted as taught by Vig for a strong chemical bond," a thermoset plastic is absolutely incapable of melting or softening after curing. Consequently, in the Vig double shot technique, after the first component having a thermoset plastic cures, that plastic does not melt or soften upon injection-molding of the second component to allow cross-linking or chemical bonding of the thermoset resins between the two components. Rather, one skilled in the art would understand that the only possible bond between the concentrator and magnet, both having thermoset plastic and made by the double shot technique disclosed in Vig, would be a

AMENDMENT AND RESPONSE
U.S. Serial No. 09/932,201
Filed: August 17, 2001

mechanical bond. A chemical bond by cross-linking or inter-bonding of the thermoset resins would be impossible.

Vig does teach that "[i]n optional step 77, the structure may be heated to cause slight melting at the interface between the concentrator and magnet element in order to provide a chemical bond between the components." However, one skilled in the art reading Vig would understand that such a chemical bond is only possible if plastic materials capable of melting after they harden (such as thermoplastics) were used. As explained above, thermosets are incapable of melting, and thus this passage in Vig cannot be read to teach chemical bonding between thermoset resins. Rather, unlike thermoset plastics whose molecules are rigidly set after cure, thermoplastics can be melted after they harden. When thermoplastics are heated, the chains of molecules can move relative to each other, allowing the mass to flow into a different shape and the molecules to link with additional molecules. Thus, any reference in Vig to chemical bonding between the concentrator and the magnet resulting from its disclosed manufacturing techniques can only occur if thermoplastics, not thermoset plastics, are used.

Thus, Vig fails to teach (and actually teaches against) chemically-bonding the concentrator and the magnet via inter-bonding of thermoset resins. Thus, combining Vig's teaching with Nishimura does not result in the subject matter recited in amended claim 1 and therefore does not render obvious claim 1.

B. Nishimura et al. and Vig et al. in further view of Adler

Claim 20 has been rejected under 35 U.S.C. § 103 as being unpatentable over Nishimura et al. and Vig et al. in further view of Adler. Applicants' Assignee respectfully traverses this rejection and requests reconsideration and withdrawal thereof. Irrespective of whether the Action's characterization of the Adler reference is correct, it fails to cure the deficiencies in the

AMENDMENT AND RESPONSE
U.S. Serial No. 09/932,201
Filed: August 17, 2001

Action's obviousness argument, identified and discussed in Part V.A. Because none of the cited references, alone or in combination, render claim 1 obvious, claim 20, which depends from claim 1, is also not obvious and is allowable.

C. Nishimura et al. and Vig et al. in further view of Schechinger et al.

Claim 21 has been rejected under 35 U.S.C. § 103 as being unpatentable over Nishimura et al. and Vig et al. in further view of Schechinger et al. Applicants' Assignee respectfully traverses this rejection and requests reconsideration and withdrawal thereof. Irrespective of whether the Action's characterization of the Schechinger et al. reference is correct, it fails to cure the deficiencies in the Action's obviousness argument, identified and discussed in Part V.A. Because none of the cited references, alone or in combination, render claim 1 obvious, claim 21, which depends from claim 1, is also not obvious and is allowable.

D. Nishimura et al. and Vig et al. in further view of Kawashima

Claims 10, 12, 13, 31, 35, and 36 have been rejected under 35 U.S.C. § 103 as being unpatentable over Nishimura et al. and Vig et al. in further view of Kawashima. Applicants' Assignee respectfully traverses this rejection and requests reconsideration and withdrawal thereof. Irrespective of whether the Action's characterization of the Kawashima reference is correct, it fails to cure the deficiencies in the Action's obviousness argument, identified and discussed in Part V.A. Because none of the cited references, alone or in combination, render claim 1 obvious, claims 10, 12, 13, 31, 35 and 36, which depend from claim 1, are also not obvious and are allowable.

AMENDMENT AND RESPONSE
U.S. Serial No. 09/932,201
Filed: August 17, 2001

E. Nishimura et al., Vig et al., and Kageyama et al. in further view of Marsal

Claims 17 and 18 are rejected under 35 U.S.C. § 103 as being unpatentable over Nishimura et al., Vig et al., and Kawashima in further view of Marsal. Applicants' Assignee respectfully traverses this rejection and requests reconsideration and withdrawal thereof. Claim 18 has been cancelled without prejudice, thereby rendering the Action's rejection of this claim moot. Moreover, irrespective of whether the Action's characterization of the Marsal reference is correct, it fails to cure the deficiencies in the Action's obviousness argument, identified and discussed in Parts V.A. and V.D. Because none of the cited references, alone or in combination, render claim 1 obvious, claim 17, which depends from claim 1, is also not obvious and is allowable.

F. Nishimura et al., Vig et al., and Kawashima in further view of Kageyama et al.

Claims 5, 8, and 37 have been rejected under 35 U.S.C. § 103 as being unpatentable over Nishimura et al., Vig et al., and Kawashima in further view of Kageyama et al. Applicants' Assignee respectfully traverses this rejection and requests reconsideration and withdrawal thereof. Irrespective of whether the Action's characterization of the Kageyama et al. reference is correct, it fails to cure the deficiencies in the Action's obviousness argument, identified and discussed in Parts V.A. and V.D. Because none of the cited references, alone or in combination, render claim 1 obvious, claims 5, 8, and 37, which depend from claim 1, are also not obvious and are allowable.

G. Nishimura et al., Vig et al., and Kageyama et al. in further view of Uchiyama

Claim 38 has been rejected under 35 U.S.C. § 103 as being unpatentable over Nishimura et al., Vig et al., and Kageyama et al. in further view of Uchiyama. Applicants' Assignee respectfully traverses this rejection and requests reconsideration and withdrawal thereof.

AMENDMENT AND RESPONSE

U.S. Serial No. 09/932,201

Filed: August 17, 2001


Irrespective of whether the Action's characterization of the Uchiyama reference is correct, it fails to cure the deficiencies in the Action's obviousness argument, identified and discussed in Parts V.A. and V.D. Because none of the cited references, alone or in combination, render claim 1 obvious, claim 38, which depends from claim 1, is also not obvious and is allowable.

AMENDMENT AND RESPONSE
U.S. Serial No. 09/932,201
Filed: August 17, 2001

CONCLUSION

Applicants' Assignee respectfully submits that claims 1, 2, 4, 5, 8, 10, 12, 13, 17, 19-21, 30, 31, and 35-39 are in condition for immediate allowance, and request early notification to that effect.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Kristin L. Johnson', is written over a horizontal line.

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